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10/698,448

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David Sparrowe

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EXAMINER

LISTVOYB, GREGORY

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/698,448	<b>Applicant(s)</b> SPARROWE ET AL.	
	<b>Examiner</b> GREGORY LISTVOYB	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 17-49 is/are pending in the application.
- 4a) Of the above claim(s) 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14, 17, 21-49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/13/2008 has been entered.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claim 1 rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for melamine-formaldehyde resins (see Examples), does not reasonably provide enablement for any other amine -containing material. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

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the court set forth eight factors to consider when assessing if a disclosure would have required undue experimentation. Citing Ex parte Forman, 230 USPQ 546 (BdApls 1986) at 547 the court recited eight factors:

(1) The nature of the invention; (2) the state of the prior art; (3) the relative skill of those in the art; (4) the predictability or unpredictability of the art; (5) the breadth of the claims; (6) the amount of direction or guidance presented; (7) the presence or absence of working example and (8) the quantity of experimentation necessary.

#### The nature of the invention and breadth of claims

The claimed invention is an electronic device, which predominantly contain melamine-formaldehyde resin. Therefore, the scope of the Claims ("organic amine derivative", multifunctional polymeric compound and initiator, meaning any amine derivative, any multifunctional polymeric compound and any initiator) is much broader than one disclosed in the Specification.

#### The state of the prior art

In the prior art to US 2001/0025414 as discussed below, a multilayered wiring board (electronic device, see Abstract) comprising Methoxymethylolmelamine (Cymel 370, see line 99). Therefore, US 2001/0025414 reference represents only a limited teaching of cross-linkable Melamine-containing material for used for electronic device.

The presence or absence of working example:

Only Melamine-formaldehyde-based amines presented in Examples. There is no Component B presented.

Note that the working example is critical factor to be considered, especially in a case involving an unpredictable and undeveloped art such as analysis of film anisotropy with humidity expansion parameter See MPEP 2164.

The quantity of experimentation necessary.

2. It is concluded that it would have require undue experimentation for one having ordinary skill in the art to practice the claimed invention to find appropriate step to expand the applicant's teaching to any other type of amines, besides one based on Melamine-formaldehyde-based amines. The above is applicable to a multifunctional organic compound and an initiator. In re Wands, 858, F.2d at 737, 8 USPQ 2d 1400, 1404 (Fed Cir. 1988).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 6, 10, 12, 17, 21, 33,40, 42, 45-49 and newly added claims 46-49 rejected under 35 U.S.C. 102(b) as being anticipated by Toyoshima et al (US 2001/0025414), herein Toyoshima.

Toyoshima discloses a multilayered wiring board (electronic device, see Abstract) comprising Methoxymethylolmelamine (Cymel 370, see line 99), which is capable of forming a crosslinked polymer with itself and/or with at least one multifunctional compound and polyvinyl acetal, which is reactive derivative from polyvinyl alcohol, which has Hydroxyl groups (see line 0099, Example 1).

In addition, Toyoshima teaches Butadiene Acrylonitrile copolymer, which can be considered as a component B, since Acrylonitrile fragment can be considered as acid derivative and it hydrolyses in water yielding amido groups. Since the amount of Cymel is 50 g and amount of Butadiene Acrylonitrile copolymer is 15 g, the melamine constitutes at least 75%wt of the total composition of A and B. (Note that either Polyvinyl Acetal and Butadiene Acrylonitrile copolymer or both can be considered as a component B based on the language of Claim 1).

Note that Toyoshima discloses one more component- 100g polyvinyl acetal resin.. However, open claim language ("comprising") allows the presents of another

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component, beyond A and B. According to claim 1, only components A and B participate in calculation of amine percentage. Therefore, considering only component A (Cymel 370) and B (butadiene-acrylonitrile copolymer), the total amount of Amine is at least 75% wt.

On the other hand, polyvinyl acetal reacts with Cymel 370 first, forming "its crosslinked polymer product obtainable by crosslinking said amine derivative with itself or with at least one multifunctional compound" as claimed in claim 1. In other words, since the polymer, based on the Methoxymethylolmelamine is claimed, the reaction product of Cymel and polyvinyl acetal can be considered as a component A.

Therefore, in both cases the limitations of claims 1 and 46-47 are met.

In addition, Toyoshima teaches water soluble melamine-type cross-linking agents (see line 0063) and water insoluble siloxane, melamine resins, acrylate resins, etc (see line 0067).

Regarding claim 10, Toyoshima uses such solvent as isopropanol and water within the claim derange (see Example 1).

In reference to claim 33, Toyoshima uses isopropyl alcohol as a solvent (see Example 1).

Regarding claim 40, Toyoshima teaches film thickness of 50 um (see line 0127).

In reference to claim 42, Toyoshima teaches dielectric constant value of 4.5-4.8 (see Table 5).

In reference to Claim 45, commercial material Cymel meets the limitations of the above claim.

Regarding newly added claims 48-49, physical properties of Toyoshima's composition are inherently equal to ones of the composition claimed, since their structures are identical.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-5, 7-9, 11, 13-14, 22-29, 38-39, 41, 43-44 rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoshima in combination with Knudsen (US 2002/0176989, cited in the previous Office Action) herein Knudsen and Chen et al (US patent 5330840, cited in the previous Office Action) herein Chen.

Toyoshima discloses a multilayered wiring board (electronic device, see Abstract) comprising Methoxymethylolmelamine (Cymel 370, see line 99), which is



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capable of forming a crosslinked polymer with itself and/or with at least one multifunctional compound and polyvinyl acetal, which is reactive derivative from polyvinyl alcohol, which has Hydroxyl groups (see line 0099, Example 1). The above components comprise at least 75%wt of the total composition.

In addition, Toyoshima teaches water soluble melamine-type cross-linking agents (see line 0063) and water insoluble siloxane, melamine resins, acrylate resins, etc (see line 0067).

Toyoshima does not teach superfine ceramic material as a component F and polyurethanes polyols

Knudsen discloses a cross-linked polyurethane based material used as a dielectric layer in printed circuit boards and other electronic devices (Abstract, line 0031 line 0051 ), which can contain ceramic materials (see line 0019) and cross-linking agents (Cymel , see line 0057, which is used in the Application examined).

The above ceramics is well known material used to increase dielectric resistance and mechanical properties of the coating. Polyurethanes are well known materials, possesses excellen mechanical properties and high adhesiveness to a substrate

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Therefore, it would have been obvious to a person of ordinary skills in the art to add the above particles and use polyurethanes in Toyoshima's composition in order to increase its dielectric constant and mechanical properties of the composition, as well as adhesiveness to a substrate.

Toyoshima or Knudsen do not teach exact structure of amine derivative as a crosslinked agent as claimed in claim 2.

Chen discloses a composition formed with cross-linkable melamine formaldehyde resin 2-80% of Cymel 303 as well as Cymel 380 and 385 (Column 6, line 5 and Claim 3), which is identical to one used in the Application examined (see page 24, mixture M1 of the Application), 25-60% of polyurethane-siloxane (Column 6, line 5 and Claim 1 ), 0.001-1% of acid catalyst (Column 7, line 5, meeting the limitations Claims 30 and 39) and a solvent. Chen discloses the use of 1,4 butanediol (see Table). Chen teaches that 1,4 butanediol used as a part of polyurethane reaction mixture. However, Chen teaches that the above component is used in excess. Therefore, presence of free 1,4 butanediol is expected in the final composition. Regarding Claim 33, Chen discloses a solvent THF (i.e. ether). Chen discloses a coating with thickness of 0.5- 50 um (see Column 7, line 30).

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The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) , 325 U.S. at 335, 65 USPQ at 301, see also also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960), *Ryco, Inc. v. Ag-Bag Corp.*, 857 F.2d 1418, 8 USPQ2d 1323 (Fed. Cir. 1988) and MPEP 2144.07.

Therefore, it would have been obvious to a person of ordinary skills in the art to interchangeably use Cymel 303 as well as Cymel 380 and 385 as cross-linking agent, since they are known material based on its suitability for their intended use.

Since Chen's composition has an excellent flexibility, adhesion to a metal surface and low dielectric constant, it would be obvious to a person with ordinary skills in the art to use it in Toyoshima/Knudsen's electronic device, including circuit boards.

Claims 30-32, 34-37 rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoshima in view of Knudsen and Chen and further view of Barancyk et al (US 2004/0044165) herein Barancyk.

Toyoshima discloses a multilayered wiring board (electronic device, see Abstract) comprising Methoxymethylolmelamine (Cymel 370, see line 99), which is capable of forming a crosslinked polymer with itself and/or with at least one multifunctional compound and polyvinyl acetal, which is reactive derivative from

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polyvinyl alcohol, which has Hydroxyl groups (see line 0099, Example 1). The above components comprise at least 75%wt of the total composition.

Knudsen discloses a cross-linked polyurethane based material used as a dielectric layer in printed circuit boards and other electronic devices (Abstract, line 0031 line 0051 ), which can contain ceramic materials (see line 0019) and cross-linking agents (Cymel , see line 0057, which is used in the Application examined).

Both Toyoshima and Knudsen teaches dielectric layer in printed circuit boards and other electronic devices based on amine derivative and a polymer.

Chen discloses a composition formed with cross-linkable melamine coating (see discussion above).

Knudsen and Toyoshima and Chen do not disclose para-toluene sulfuric acid as a catalyst, surfactant and a butanol as a solvent.

Barancyk discloses a coating composition based on siloxanes (see line 0027), urethanes (see line 0049), diols (line 0061) and cross-linking agent, based on Cymel (see line 0082). Note that Barancyk's composition includes the same ingredients as Chen's one.

Barancyk uses para-toluene sulfonic acid as a catalyst (see line 0215). The advantage of the above catalyst compare to TFA used by Chen is that para- toluene sulfonic acid has much higher boiling point, making possible high temperature cure.

Therefore, it would have been obvious to a person of ordinary skills in the art to use para-toluene sulfonic acid as a catalyst to perform high temperature curing process.

Barancyk uses 5-80% of butanol and ketones as a solvent (see lines 0213-0214). Butanol is a commonly used solvent with hydrophilic-lipophilic properties. The advantage of butanol over THF or chlorinated hydrocarbons used by Chen is its lower toxicity and price.

Therefore, it would have been obvious to a person of ordinary skills in the art to use butanol as a solvent in Chen's composition, due to its lower toxicity and price.

Barancyk uses polyoxyethylene (Pluronic) as a surface active agent (see line 0199). The use of the above agent allows better contact between the composition and a substrate.

Therefore, it would have been obvious to a person of ordinary skills in the art to use polyoxyethylene (Pluronic) as a surface active agent in Chen's composition, providing better contact between a substrate and the composition.

### ***Response to Arguments***

Applicant's arguments filed on 11/13/2008 have been fully considered but they are not persuasive.

Applicant argues that when Wand's factor applied, before the issue of undue experimentation arises, the PTO must present reasons to doubt the veracity of the objective enablement statements presented in an applicants' specification.

In particular, Applicant states that even with respect to determining whether undue experimentation is needed, breadth is but one of the Wands factors, not a determinative factor.

Examiner disagrees. Breadth of claim is one of eight Wand's factors, which can be equally applied. The Law does not require what all of the Wand's factors should be applied. In the previous Office Action three of the above factors are analyzed (see discussion above). Unfortunately, the Applicant does not present any factual arguments in order to rebut the previous rejection.

Regarding Toyoshima, Applicant argues that reference does not meet applicants' claim 1 recites that the composition contains at least 75% by weight of component A based on the total weight of components A, B, and C.

This is incorrect. Applicant's claim contains open language ("comprising"), which mean that that either Polyvinyl Acetal and Butadiene Acrylonitrile copolymer or both can be considered as a component B based on the language of Claim 1. Among them at least Butadiene Acrylonitrile copolymer meets the above claim limitations.

Regarding Chen, Applicant argues that polyurethane-polysiloxane block-copolymers would not be as a multifunctional organic compounds.

This is incorrect statement. Even polydimethylsiloxane alone can be considered as a multifunctional organic compound, since it has multiple functional groups.

Applicant argues that It is noted that Chen broadly disclose that the amount of melamine resin can be 2-80 wt. %. However, the disclosure clearly suggests using amounts that are much lower than 80 wt. %. For example, 10-40 wt. % is preferred (column 6, lines 6-9).

First, Chen is a secondary reference. Primary reference Toyoshima teaches more than 75% wt of component A.

Second, according to MPEP 2123, disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments (see also *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971), *In re Gurley*, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994) , *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

Applicant argues that Chen does not teach that his laminate can be used in electronic device.

However, as mentioned in the discussion above, Chen's composition has an excellent flexibility, adhesion to a metal surface and low dielectric constant, it would be obvious to a person with ordinary skills in the art to use it in Toyoshima/Knudsen's electronic device, including circuit boards.

In another words, Chen's invention solves the same problem, which are important circuit board design.

Applicant argues that Chen does not have the same dielectric constant as a composition of the Application. However, as stated above, since Chen's composition essentially has the same base material (i.e. up to 80% of Cymel) and thickness of 0.5-50 um, it has the same dielectric properties as the dielectric of the Application examined.

Applicant argues that "It is noted that Chen et al. broadly disclose that the amount of melamine resin can be 2-80 wt. %. However, the disclosure clearly suggests using amounts that are much lower than 80 wt. %. For example, 10-40 wt. % is preferred (column 6, lines 6-9). See also the disclosure at column 6, lines 63-67 regarding relative amounts of the polyurethane/polysiloxane block copolymer and the melamine resin".



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However, according to MPEP 2123, disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments (see also *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971), *In re Gurley*, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994) , *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

Amount of cross-linking agent applied depends on the such requirements for the final article as mechanical properties, temperature range of using, dielectric constants, etc. This amount can be varied by an artisan over the course of routine experimentation.

Regarding Knudsen, the Applicant argues that it is evident that this is a vast grouping of polymers. It is noted that polyurethanes are included within this extremely broad genus. However, it would have been obvious to a person of ordinary skills in the art that virtually any of them can be used in the composition with reasonable expectation of success.

Applicant argues that the rejection fails to set forth where Knudsen et al. disclose any of the features of the composition recited in applicants' claims. Thus, for example, it is unclear which components of the composition disclosed by Knudsen et al. are asserted to correspond to component A, component B, and optional component C, of applicants' composition.

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This is incorrect. Knudsen discloses a cross-linked polyurethane based material used as a dielectric layer in printed circuit boards and other electronic devices (Abstract, line 0031 line 0051 ), which can contain ceramic materials (see line 0019) and cross-linking agents (Cymel , see line 0057, which is used in the Application examined). Therefore, identification of components A and B are clear.

Amount of cross-linking agent applied depends on the such requirements for the final article as mechanical properties, temperature range of using, dielectric constants, etc. This amount can be varied by an artisan over the course of routine experimentation.

The Applicant argues that polyorganosiloxanes are not included in the list above. The Toyoshima reference presents polyorganosiloxanes as an insulating material in electronic devices.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREGORY LISTVOYB whose telephone number is (571)272-6105. The examiner can normally be reached on 10am-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rabon Sergent/  
Primary Examiner, Art Unit 1796

GL